



DAVINCI  
MEDICAL  
ACADEMY

# SUBJECTS IN NUTSHELL FOR EFFECTIVE REVISION



## ANATOMY IN NUTSHELL

### HEAD OFFICE:

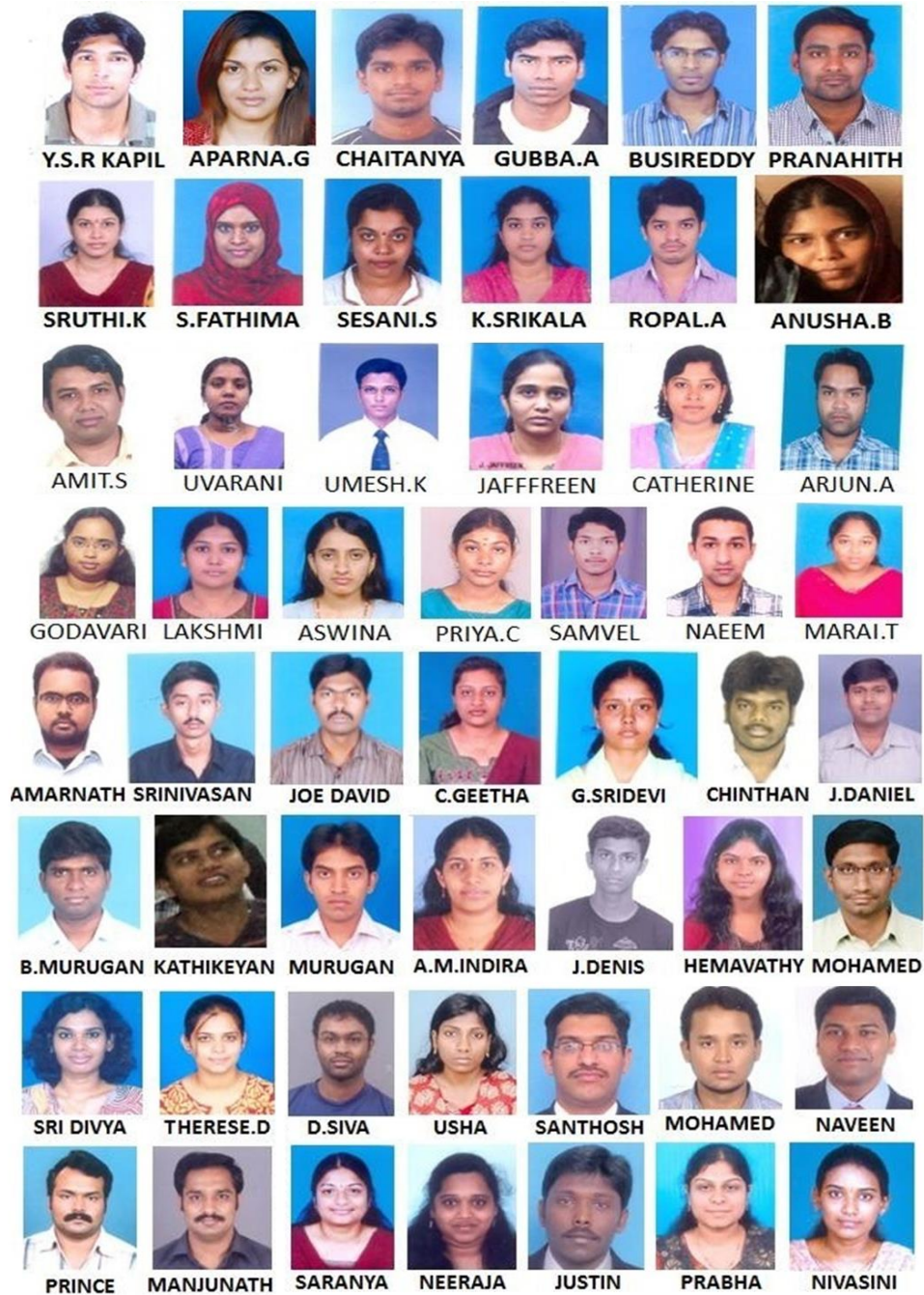
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## ELITE TEAM OF FACULTY



## SOME OF OUR FMGE TOPPERS



# DMA'S CORNER OF WISDOM

## ABDOMEN

### PLANES OF ABDOMEN

- **Trans pyloric plane(of Addison):**
  - Passes midway between the supra sternal notch & the symphysis pubis.
  - Anteriorly it passes through the tips of the ninth costal cartilages & posteriorly through the body of L<sub>1</sub> vertebra near its lower border.
  - organs found at transpyloric plane
    - pylorus
    - superior part of duodenum
    - duodenojejunal flexure
    - fundus of gallbladder
- **Trans tubercular plane:** Passes through tubercles of iliac crest and the body of vertebra L-5 near its upper border.
- **Subcostal plane:** Passes through the lower borders of the 10<sup>th</sup> costal cartilages & body of vertebra L-3.

### ABDOMINAL WALL

- **Layers of abdominal wall**
  - Skin
  - Subcutaneous fat
  - Scarpa's fascia
  - External oblique
  - Internal oblique
  - Transversus abdominus
  - Transversalis fascia
  - Preperitoneal fat
  - Peritoneum

### ABDOMINAL REGIONS

- Right hypochondria
- Left hypochondria
- Right and left lumbar
- Right and left inguinal
- Epigastric
- Umbilical
- Hypogastric (pubic) region

### GREATER OMENTUM

- Also called as **policeman of abdomen**
- Consist of 4 layers
- Prevents visceral and parietal peritoneum from adhering
- Contains fats, lymphocytes and immune cells
- Acts as an insulator to protect against loss of body heat

### BLOOD SUPPLY OF GI TRACT BRANCHES:

ARTERY OF FORE - GUT	ARTERY OF GUT	ARTERY OF HIND GUT
Coeliac Trunk	Superior Mesenteric. A	Inferior Mesenteric. A
1. Left gastric. A 2. Splenic.A • Left gastro - epiploic.A • Short gastric. A • Pancreatic. A 3. Hepatic.A • Right gastric. A • Right Hepatic.A • Cystic. A • Left Hepatic.A • Gastro - duodenal. A • Rt.gastro epiploic.A • <b>Superior pancreatico duodenal. A</b>	1. <b>Inf. pancreatico duodenal. A</b> 2. Middle colic. A 3. Right colic. A 4. Ileo-colic. A • Superior & Inferior branch • Anterior cecal.A • Posterior cecal.A(Appendicular) • Jejunal & Ileal.A	1. Superior Rectal. A 2. Sigmoid. A 3. Left colic. A

## DMA'S CORNER OF WISDOM

### Salient Points:

- Right gastro epiploic.A is a br.of Gastroduodenal.A but Left gastro epiploic.A. is a br. Of Splenic.A.
- Right gastric. A is a br.of Hepatic.A & Left gastric. A is a br.of celiac. A
- Superior pancreatico - duodenal is a br.of Gastroduodenal.A Where as inferior is a br. Of superior Mesenteric. A

### PORTAL VEIN

- Formed by union of superior mesenteric and splenic veins behind the neck of Pancreas (L<sub>2</sub>)
- Tributaries:
  - Left & Right gastric. V
  - Cystic.V
  - Superior Pancreatico-duodenal.V
  - Para umbilical. V

### Relations:

Part	Position	Structure
Intra - duodenal part	Anterior	Neck of pancreas
	Posterior	IVC
Retro - duodenal part	Anterior	<ul style="list-style-type: none"> <li>• Duodenum (1<sup>st</sup> part)</li> <li>• CBD</li> <li>• Gastro - duodenal. A</li> </ul>
	Posterior	IVC
Supra - duodenal	Anterior	<ul style="list-style-type: none"> <li>• Hepatic A</li> <li>• Bile duct</li> </ul>

### DUODENUM

- **Development**
  - Partly from foregut & partly from midgut. the opening of the bile duct into the second part of duodenum represents the junction.
- **Blood Supply**
  - Upto the level of the opening of the bile duct, the duodenum is supplied by the superior pancreatico duodenal. A (Br.of Gastro - duodenal. A from celiac trunk) and below it by the inferior pancreatico - duodenal. A (Br.of Superior Mesenteric Artery)

### THIRD PART OF DUODENUM

- 10cm long, Retroperitoneal & fixed
- Anterior Surface is covered with Peritoneum except in the median plane
- **Salient Points**
  - ✓ Ist (superior) part - 5cm long, proximally free, distally fixed
  - ✓ IInd (descending) part - 7.5cm long, fixed throughout
  - ✓ IIIRD (Horizontal) part - 10cm long, fixed throughout
  - ✓ IVth (Ascending) part - 2.5cm long, Terminal part is free

### LESSER OMENTUM

- It is a fold of peritoneum which extends from lesser curvature of stomach and 1<sup>st</sup> 2cm of duodenum to the liver
- The ligaments are Hepatogastric ligament & Hepato duodenal ligament

#### Content of Rt. Free margin

Portal Vein & Hepatic Artery  
Hepatic plexus of nerve  
Hepatic Duct  
Lymph nodes

#### Content along lesser curvature of stomach & duodenum

Gastric nerve  
Gastric group of lymph nodes  
Right and Left Gastric Vessels

## DMA'S CORNER OF WISDOM

### EPIPLOIC FORAMEN/FORAMEN OF WINSLOW

- Opening through which the lesser sac communicates with the greater sac.
- Situated behind right free margin of lesser omentum at T<sub>12</sub> level.

#### Boundaries:

Anteriorly	Posteriorly	Superiorly	Inferiorly
Right free margin of lesser omentum containing <ul style="list-style-type: none"> <li>• Portal Vein</li> <li>• Hepatic Artery</li> <li>• Bile duct</li> </ul>	<ul style="list-style-type: none"> <li>• Right adrenal gland</li> <li>• IVC</li> <li>• T<sub>12</sub> Vertebra</li> </ul>	Caudate lobe of liver	Duodenum (1st part) Hepatic.A

### PORTO-CAVAL ANASTOMOSIS

SITES	PORTAL COMPONENT	SYSTEMIC COMPONENT	OBSTRUCTION LEADS
Lower ends of Oesophagus	Left gastric.V	Azygous.V	Esophageal Varices
Rectum & Anal canal	Superior rectal.V	Middle & Inferior rectal.V	Hemorrhoids
Umbilicus	Para - umbilical.V	Superficial epigastric.V	Caput medusae
Posterior abdominal wall	Colic Veins	Retroperitoneal Veins	
Bare area of liver	Hepatic Venules	Phrenic & Intercostal Veins	

- Left testicular/Ovarian/Supra renal drain into left renal Vein before entering IVC.
- Right testicular/Ovarian/Supra renal vein and both renal veins drain into IVC.
- Left renal.V is 3 times longer than right renal.V. So, left kidney is chosen for transplantation.

### LESSER SAC

- Also called **Omental bursa**, it is a large recess of peritoneal cavity behind stomach, lesser omentum and caudate lobe of liver
- It separates stomach bed from stomach
- The Left sub hepatic space is merely the lesser sac
- **Boundaries:**
  - Anterior - Caudate lobe of liver
  - Stomach
  - Lesser omentum
  - Greater Omentum (ant.2 layers)
  - Posterior - Greater omentum (Post 2 layers)
- Structures forming stomach bed
  - Diaphragm
  - Left kidney & Supra renal gland
  - Spleenic flexure of colon
  - Spleenic.A
  - Spleen
  - Transverse mesocolon
- Also called right posterior/right sub hepatic space or **Hepatorenal pouch**

#### Boundaries:

Anteriorly	Posteriorly	Superiorly	Inferiorly
<ul style="list-style-type: none"> <li>• Inferior surface of right lobe of the liver</li> <li>• Gall Bladder</li> </ul>	<ul style="list-style-type: none"> <li>• Right Suprarenal gland</li> <li>• Upper part of right kidney</li> <li>• Duodenum (II part)</li> <li>• Colon - hepatic flexure</li> <li>• Transverse mesocolon</li> <li>• Part of the head of pancreas</li> </ul>	<ul style="list-style-type: none"> <li>• Inferior layer of the coronary ligament</li> </ul>	Opens into the general peritoneal cavity

- Morison's Pouch is the commonest site of sub phrenic abscess.
- Recto - uterine Pouch is also called the pouch of Douglas.

# DMA'S CORNER OF WISDOM

## SOLID ORGANS

ORGAN	WEIGHT (in grams)
○ Spleen	• 200
○ Kidney	• 150
○ Pancreas	• 100
○ Adrenal gland	• 5
○ Prostate gland	• 10
○ Liver	• 1500

### LIVER

- Largest gland in the body, covered by glisson's capsule
- **External features:**
- Surfaces - (5) - Anterior, Posterior, Superior, Inferior, Right;
- Lobes - (2) - Right and left [**Right lobe occupies 5/6<sup>th</sup> of the liver has all the 5 surfaces and presents the caudate lobe & quadrate lobe.**]
- Lobes are divided by
  - ✓ Attachment of falciform lig - Anteriorly & Superiorly
  - ✓ Fissure for the ligamentum teres - inferiorly
  - ✓ Fissure for the ligamentum venosum - Posteriorly

### Relations of the Liver

ANTERIOR SURFACE	POSTERIOR SURFACE	SUPERIOR SURFACE	INFERIOR SURFACE	RIGHT SURFACE
<ul style="list-style-type: none"> <li>• Xiphoid process</li> <li>• Ant - Abdominal wall</li> <li>• Diaphragm (each side)</li> </ul> <p><b>Falciform Lig. Gets Attached to this surface</b></p>	<ul style="list-style-type: none"> <li>a. <b>Bare area of liver</b> <ul style="list-style-type: none"> <li>• Related to Right Suprarenal gland &amp; diaphragm</li> </ul> </li> <li>b. <b>Groove for IVC</b> <ul style="list-style-type: none"> <li>• Lodges IVC</li> </ul> </li> <li>c. <b>Caudate lobe</b> <ul style="list-style-type: none"> <li>• Diaphragmatic crura</li> <li>• Right Inferior phrenic.A</li> <li>• Coeliac trunk</li> </ul> </li> <li>d. Fissure for ligamentum venosum</li> <li>e. Oesophageal impression</li> </ul>	<ul style="list-style-type: none"> <li>• Cardiac Impression</li> <li>• Dome of the diaphragm</li> </ul>	<ul style="list-style-type: none"> <li>• Gastric impression</li> <li>• Omental tuberosity</li> <li>• Fissure for ligamentum teres</li> <li>• <b>Quadrate lobe:</b> <ul style="list-style-type: none"> <li>a. Lesser omentum</li> <li>b. Pylorus</li> <li>c. First part of duodenum</li> </ul> </li> <li>• Fossa for gall bladder</li> <li>• <b>Impressions of</b> <ul style="list-style-type: none"> <li>a. Hepatic flexure</li> <li>b. Right kidney</li> <li>c. IInd part of duodenum</li> </ul> </li> </ul>	<p><b>Upper 1/3</b> Diaphragm Pleura Lung</p> <p><b>Middle 1/3</b> Diaphragm Pleura</p> <p><b>Lower 1/3</b> diaphragm</p>

**PERITONEAL RELATIONS:** Most of the hepatic surface is covered by peritoneum except:

- Bare - area
  - Groove for IVC
  - Fossa of Gall bladder
  - Coronary ligament
  - Lesser Omentum
- **Blood Supply:** 20% → from Hepatic. A 80% → Portal vein
  - **Venous drainage:** Hepatic Veins then into IVC
  - **Salient Points**
    - Couinad's classification is based on hepatic vein mainly and portal vein.
    - Each Couinad Segment Contains Portal Vein, Bile duct and a branch of hepatic artery.
    - Liver biopsy is done through Right 8<sup>th</sup> intercostal Space.
  - An intraperitoneal organ.
  - Located in the RUQ and epigastric areas, extending into the LUQ.

## DMA'S CORNER OF WISDOM

- Covered by a fibrous layer, known as Glisson's capsule
- Microscopically hepatocytes are arranged into lobules. Each lobule is drained by a central vein.
- Cells of liver
  - Hepatocytes
  - Kupffer cells- liver macrophages
  - Ito cells- storage site of vitamin A
- Bare areas of liver (areas not covered by peritoneum) are
  - Fossa of gallbladder
- Liver synthesizes vitamin K
- Liver stores vitamin A
- The anatomy of the liver can be described using two different aspects: morphological anatomy and functional anatomy.
- The liver is divided into nine functionally independent segments.
  - ✓ Liver is divided into right and left lobes by **Middle hepatic vein**
  - ✓ The right lobe is divided into anterior and posterior segments by **right hepatic vein**.
  - ✓ The left lobe is divided into a medial- segment IV and a lateral part - segment II and III by **falciform ligament**
  - ✓ **The portal vein** divides the liver into upper and lower segments.
  - ✓ Segment 4 is the largest segment. Anatomically its part of right lobe and functionally it's a part of left lobe.
  - ✓ Caudate lobe drains into both right and left hepatic duct .so it is a separate lobe. It has 1<sup>st</sup> + 9<sup>th</sup> segment major part of caudate lobe is segment 1 and small part is segment 9.
- **Biliary drainage of liver:** Bile drains from the liver to the small intestine via bile ducts
- The part where portal vein enters the liver is called as **porta hepatis**
  - **Structures present in porta hepatis**
    - ✓ Portal vein- posteriorly
    - ✓ Hepatic artery middle
    - ✓ CBD - anteriorly

### SPLEEN

- It's a retroperitoneal organ
- Largest organ in the lymphatic system- cellular components of spleen create a highly vascular spongy parenchyma called red and white pulp.
- Fist-shaped, purple, and about 4 inches long. (splenomegaly-a condition in which spleen measures more than 12cm )
- Located under the ribcage and above the stomach in the LUQ of the abdomen from T-10 to T-11.
- spleen is superior and lateral to left kidney
- Protected by 9th to 11th ribs. So injuries to these ribs can damage the spleen.
- spleen is attached to
  - greater curvature of the stomach by the gastrosplenic ligament
  - left kidney by the lienorenal ligament
- arterial supply-
  - splenic artery (branch from the celiac trunk of the aorta)
- venous drainage
  - splenic vein
- splenic vessels enter and exit through splenic hilum . Hilum, of spleen is the Mc site for accessory spleen
- spleno renal ligament contains splenic artery and tail of pancreas
- spleen is the most common organ affected in blunt abdominal trauma

# DMA'S CORNER OF WISDOM

## PANCREAS

- It's a retroperitoneal organ
- Parts-head,uncinate process, neck, body and tail
  - head 3.5 cm or less
  - neck 1-2 cm or less
  - body 2.5 cm or less
  - tail 2.5 cm or less
- Head of the pancreas is adjacent to the pylorus and transverse colon
- Neck of the pancreas lies directly over the portal vein. It is the site of passage of the superior mesenteric vessels
- Tail of the pancreas is mobile
- Duct of Wirsung- a/k/a main pancreatic duct which runs in tail of pancreas to pancreas head. it joins the bile duct at the hepaticopancreatic ampulla (of Vater)
- Ampulla of Vater opens into Major Duodenal Papilla. It connects pancreatic and common bile ducts.
- Minor Pancreatic Duct empty into minor duodenal papilla
- Both these major and minor papilla are located in 2nd part of the duodenum on the posteriomedial wall. The main difference between them is the minor papilla lacks the characteristic mucosal folds.
- **Blood supply to the pancreas**
  - Gastroduodenal Artery- it becomes
    - Anterior superior artery
    - pancreaticoduodenal artery
    - Posterior superior artery
    - pancreaticoduodenal artery
  - Superior Mesenteric Artery- it becomes
    - Anterior Inferior artery
    - pancreaticoduodenal artery
  - Posterior Inferior artery
  - pancreaticoduodenal artery
  - Inferior Pancreatic Artery
  - Splenic Artery- it becomes
    - Dorsal pancreatic artery
    - Great pancreatic artery
    - Caudal pancreatic artery
- **Venous drainage of pancreas**
  - Anterior Superior pancreaticoduodenal Vein --> R gastroepiploic Vein
  - Posterior Superior pancreaticoduodenal Vein --> Portal Vein
  - Ant/Post Inferior pancreaticoduodenal Vein --> SMV, IMV, splenic Vein
- **Lymphatic drainage of pancreas**
  - Pancreaticosplenic lymph nodes
  - pyloric lymph nodes
  - superior mesenteric LN or celiac LN via hepatic LN
- **Nerve supply to pancreas**
  - sympathetic - greater and lesser thoracic splanchnic nerves
  - para sympathetic - celiac division of posterior vagal trunk

## KIDNEYS

- It's a retroperitoneal organ present in posterior abdominal wall

### Anterior Relations:

Left Kidney	Right Kidney
<ul style="list-style-type: none"> <li>• Supra - renal gland</li> <li>• Small Intestine (jejunum) &amp; Stomach</li> <li>• Spleen &amp; Its vessels, Splenic flexure</li> <li>• Descending colon, Pancreas</li> </ul>	<ul style="list-style-type: none"> <li>• Supra - renal gland</li> <li>• Jejunum</li> <li>• Second part of duodenum</li> <li>• Hepatic flexure of colon &amp; Liver</li> </ul>

### Posterior Relations (of both kidneys)

Muscles(4)	Nerves(3)	Ligaments(2)	Vessel & Rib(each1)
<ul style="list-style-type: none"> <li>• Diaphragm</li> <li>• Psoas major</li> <li>• Quadratus lumborum</li> <li>• Transversus abdominis</li> </ul>	<ul style="list-style-type: none"> <li>• Subcostal.N</li> <li>• Iliohypogastric.N</li> <li>• Ilioinguinal. N</li> </ul>	<ul style="list-style-type: none"> <li>• Medial arcuate</li> <li>• Lateral arcuate</li> </ul>	<ul style="list-style-type: none"> <li>• Subcostal Vessels</li> <li>• Right kidney-12<sup>th</sup> rib               <ul style="list-style-type: none"> <li>• Left kidney is related to 11<sup>th</sup> and 12<sup>th</sup> rib</li> </ul> </li> </ul>

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## DMA'S CORNER OF WISDOM

- Kidney is related to the vertebrae T12, L1-3
- Kidney starts from T12 level and extend from T12 to L3
- **Capsules (coverings) of kidney**
  - The Fibrous capsule
  - Perirenal or Perinephric fat
  - Renal fascia:
    - **Perirenal fat - Fascia of Gerota ; Anterior layer - Fascia of toldt; Posterior layer - Fascia of zuckerkindl**
  - Pararenal or Paranephric body (fat)
- **Arterial Supply:**
  - One Renal. A on each side, arising from the abdomen aorta
  - Accessory renal arteries are present in 30% of individuals
- **Venous Drainage:** Renal vein, one on each side which drains into IVC.
- **Muscles that surround the kidney**
  - Psoas major
  - Quadrates lumborum
  - Transverses abdominis
- **Nerves related to kidney**
  - The renal plexus is located around the renal artery and contains postganglionic fibers from the sympathetic nervous system (Th10 to L2).
  - The nerve fibers from the plexus enter the kidney with the branches of the renal artery and regulate the vascular tone and the secretion of renin.
- **Renal angle –**
  - Angle between erector spinae with 12<sup>th</sup> rib
  - Erector spinae is a muscle which is located between kidney and vertebra
  - It's the site of maximum tenderness in kidney disease
- **Salient Points**
  - Left kidney is usually chosen for transplantation as it has longer renal vein.
  - Transplanted kidney is placed in Iliac fossa. Ureter is kept short to avoid distal ischemia
  - Renal artery anastomosed to external or internal iliac artery.

### URETERS

- 25cm long, upper half lies in the abdomen and the lower half in the pelvis. The course is:

**Begins within the renal sinus as a funnel shaped dilatation, the renal pelvis**



**Passes through the hilum**



**Goes downwards & medially**



**Enters the pelvis by crossing in front of common iliac artery**



**Reach the base of the bladder after course in various directions**



**Obliquely enters the bladder wall & opens into it at the lateral angle of trigone.**

- **Constrictions on ureter:**
  - At the pelvis - ureteric junction
  - At the brim of the lesser pelvis
  - At its passage through the bladder wall

## DMA'S CORNER OF WISDOM

### Relations of the Ureter:

#### ABDOMINAL PART OF URETER

Anteriorly		Posteriorly	Medially	
Right side	Left side		Right side	Left side
<ul style="list-style-type: none"> <li>• 3rd part of duodenum</li> <li>• Peritoneum</li> <li>• Right colic vessels</li> <li>• Ileocolic vessels</li> <li>• Gonadal vessels</li> <li>• Root of mesentery</li> <li>• Terminal part of Ileum</li> </ul>	<ul style="list-style-type: none"> <li>• Peritoneum</li> <li>• Gonadal artery</li> <li>• Left colic vessels</li> <li>• Sigmoid colon</li> <li>• Sigmoid mesocolon</li> </ul>	<ul style="list-style-type: none"> <li>• Psoas major</li> <li>• Tips of transverse Process</li> <li>• Genitofemoral nerve</li> </ul>	IVC	<ul style="list-style-type: none"> <li>• Left gonadal vein</li> <li>• Inferior mesenteric vein</li> </ul>

#### PELVIC PART OF URETER

In its Downward Course		In its Forward Course	
Posteriorly	Laterally	In Males	In Females
<ul style="list-style-type: none"> <li>• Internal Iliac. A and its anterior division</li> <li>• Internal Iliac. V</li> <li>• Lumbosacral trunk</li> <li>• Sacro-Iliac joint</li> </ul>	<ul style="list-style-type: none"> <li>• Fascia of obturator internus</li> <li>• Superior vesical. A</li> <li>• Obturator. N</li> <li>• Obturator. A</li> <li>• Obturator. V</li> <li>• Inferior vesical. V</li> <li>• Middle Rectal. A</li> </ul>	<ul style="list-style-type: none"> <li>• Ductus deferens crosses the ureter from lateral to medial side</li> <li>• Seminal vesicle lies below and behind the ureter</li> <li>• Vesical veins surround its terminal part</li> </ul>	<ul style="list-style-type: none"> <li>• Ureter lies in lower &amp; medial part of broad ligament</li> <li>• Uterine. A lies first above and in front and then crosses it from lateral to medial side</li> <li>• Ureter lies 2cm lateral to the supra vaginal portion of cervix &amp; runs above the lateral fornix</li> <li>• The terminal portion lies anterior to vagina</li> </ul>

#### ○ BLOOD SUPPLY:

- Upper part → renal artery      Middle part → From Aorta
- Pelvic part → Vesical, middle rectal or uterine vessels

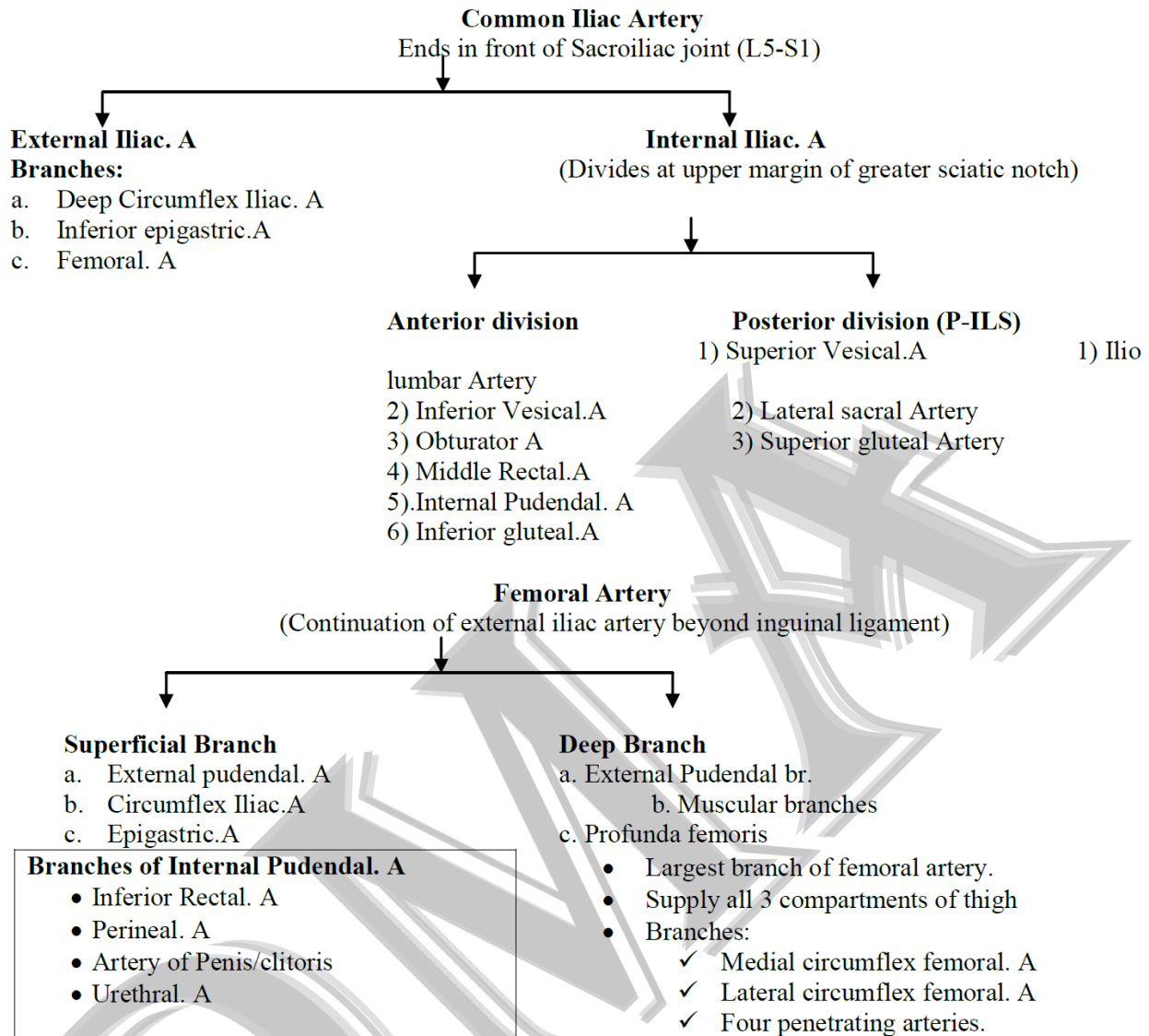
#### ○ TRIGONE OF THE BLADDER

- Present over the lower part of the base of the bladder.
- Here the mucosa is smooth due to its firm attachment to the muscular coat.
- The internal urethral orifice is located here.
- A Slight elevation on the trigone immediately posterior to the urethral orifice, produced by the median lobe of prostate is called the **uvula vesicae**.
- At the base of trigone is formed by the interureteric ridge or bar of Miercer produced by the Continuation of the inner longitudinal muscle coats of the two ureters.

### URETHRA (3 parts)

PROSTATIC URETHRA	MEMBRANOUS URETHRA	SPONGY/PENILE URETHRA
<ul style="list-style-type: none"> <li>• <b>Widest &amp; Most</b> dilatable</li> <li>• Shows Urethral crest</li> <li>• Transverse Section is Semi lunar</li> </ul>	<ul style="list-style-type: none"> <li>• Shortest Portion of urethra</li> <li>• Narrowest and least dilatable part of male urethra, except the urethral orifice</li> <li>• transverse section is stellate</li> <li>• Bulbo - urethral glands are situated</li> </ul>	<ul style="list-style-type: none"> <li>• Longest portion</li> <li>• External urethral orifice is the <b>narrowest part</b></li> <li>• Bulbo - urethral glands open here</li> </ul>

## DMA'S CORNER OF WISDOM



### Salient Points:

- In females, Uterine. A, comes as a seventh branch of ant division of internal iliac. A. and Inferior Vesicular. A is replaced by Vaginal. A. Thus,
  - ✓ Superior Rectal. A → Branch of Inferior Mesenteric. A
  - ✓ Middle Rectal. A → Branch of ant division of int Iliac. A
  - ✓ Inferior Rectal. A → Branch of internal Pudendal. A

### INGUINAL CANAL

- It is a 4cm long intramuscular canal, directed downward forward and medially.
- Extends from Deep Inguinal Ring (DIR) to superficial Inguinal Ring (SIR).

### BOUNDARIES:

Anterior wall	Posterior wall	Floor (Inferior wall)	Roof (superior wall)
<ul style="list-style-type: none"> <li>• External Oblique aponeurosis (in entire length)</li> <li>• Internal oblique muscle (in lateral 1/3<sup>rd</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>• Fascia transversalis (entire length)</li> <li>• Conjoint tendon (common tendon of insertion of internal oblique &amp; transversus abdominis)</li> </ul>	<ul style="list-style-type: none"> <li>• Inguinal ligament</li> <li>• Lacunar ligament</li> </ul>	<ul style="list-style-type: none"> <li>• Internal oblique</li> <li>• Transversus abdominis</li> </ul>

## DMA'S CORNER OF WISDOM

### OPENINGS

- **Deep (Internal) Inguinal Ring:**  
-An oval opening in fascia transversalis, 1.2cm above mid - inguinal point
- **Superficial (external) Inguinal Ring:**  
-Triangular defect in aponeurosis of external oblique muscle situated 1cm above and lateral to pubic tubercle

### SPERMATIC CORD

- **Coverings:**
- Form within outwards,
  - a. Internal spermatic fascia - derived from fascia Transversalis
  - b. Cremasteric fascia - derived from internal oblique & transverses abdominalis
  - c. External spermatic fascia - derived from external oblique aponeurosis
- **Contents:**
  - i. Remains of processus vaginalis
  - ii. Ductus deferens
  - iii. Artery of ductus deferens
    - Testicular artery
    - Cremasteric artery
  - iv. Pampiniform plexus of veins
  - v. Lymph vessels of the testes
  - vi. Genital branch of Genito femoral Nerve
  - vii. Sympathetic nerves around artery of ductus deferens.
- **Salient Points:**
  - **Spermatic cord and Ilio – inguinal nerve are the contents of Inguinal canal in males**
  - **In females, the round ligament of uterus passes through the canal, instead of spermatic cord**
  - Ilioinguinal nerve enters the canal through the interval between external & internal oblique and not via the deep Inguinal ring. But it passes out through the superficial ring.

### PARTS OF ANAL CANAL

- **Anal canal is divided into 3 anatomical zones.**

Upper (Mucous) zone	Middle (Transitional) zone/pecten	Lower (cutaneous) zone
<ul style="list-style-type: none"><li>• 15mm</li><li>• Simple columnar mucous membrane</li><li>• Pain insensitive</li></ul>	<ul style="list-style-type: none"><li>• 15mm</li><li>• Non - keratinized stratified squamous epithelium</li><li>• Sebaceous and sweat glands are absent</li><li>• Pain Sensitive</li></ul>	<ul style="list-style-type: none"><li>• 8mm</li><li>• Non - keratinized stratified squamous epithelium</li><li>• Sebaceous and sweat glands are present</li><li>• Pain Sensitive</li></ul>

- **Salient Points:**
  - Dentate/Pectinate lies between upper & middle part
  - White line of Hilton lies at lower limit of middle (transitional) part
  - Anal glands at the dentate line
  -

### COVERINGS OF THE TESTIS

- The testis is covered by three coats. From without inwards, these are
    - a. Tunica Vaginalis
      - Represents the lower persistent portion of the processus Vaginalis. Deficient in its posterior border.
    - b. Tunica albuginea
      - Dense, white fibrous coat covering the testis all around.
      - Covered by the visceral layer of tunica vaginalis, except posteriorly, through which the testicular Vessels and nerves enter the gland.
      - Posterior border is thickened to form a septum called the mediastinum testis.
- Tunica Vasculosa: Innermost, Vascular coat of the testis lining its lobules

## DMA'S CORNER OF WISDOM

### PUDENDAL CANAL

- Also called Alcock's canal, is a fascial canal in the lateral wall of the ischiorectal fossa.
- It encloses the pudendal nerve and internal Pudendal vessels (Artery & Vein).
- The fascia of the canal is fused with
  - a. Lower part of Obturator fascia - laterally
  - b. Lunate fascia - above
  - c. Perineal fascia - medially
  - d. Falciform process of the sacrotuberous lig - below
- **Nerve to the obturator internus (L5,S1,S2)** is a branch of the sacral plexus.
  - It enters the gluteal region through the greater sciatic foramen and crosses the ischial spine, lateral to the internal Pudendal vessels, to re - enter the Pelvis. & supplies the obturator internus and the gemellus superior.

#### • Some Important Levels and their Significance:

Structures	Level
Trachea	C6 - T5
Tracheal bifurcation	T4 - T5
Arch of Aorta	Begins & Ends at T4
Xiphoid Process	T9
Spleen	Obliquely along axis of 10 <sup>th</sup> rib
Celiac Trunk	T12 - L1
Superior Mesenteric. A	L1
Pylorus of stomach	L1
Spinal cord termination	L1 (Adults),L3(new born)
Pancreas	L1,L2
Left Renal vein	L2
Inferior Mesenteric. A	L3
Umbilicus	L3/L4
Termination of Aorta	L4
Trans tubercular Plane	L5
Anterior Superior Iliac spine	Sacral Promontory
Pubic Symphysis	Tip of coccyx
Ist part of Duodenum	L1
IInd part of Duodenum	L2
IIIrd part of Duodenum	L3

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